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The increasing unemployment gap between the low and high educated in West Germany. Structural or cyclical crowding-out?

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Abstract

This paper addresses trends in education-specific unemployment risks at labor market entry in West Germany from the mid-1970s to the present. In line with previous research it shows that vocationally qualified school-leavers have relatively lower unemployment risks than school-leavers with general education. Over time, the gap in unemployment risks between the low-educated and medium- and highly educated labor market entrants substantially widened for both sexes. The literature identifies two different mechanisms for this trend: structural or cyclical crowding out. While in the former scenario low-educated become increasingly unemployed due to an oversupply of tertiary graduates and displacement from above, in the latter their relative unemployment risk varies with the business cycle. The results provide evidence for cyclical rather than structural crowding-out in West Germany. Since macroeconomic conditions became generally worse over time, this strongly explains the widening unemployment gap between the low-educated and all other education groups.

Keywords

Returns to education; Unemployment; Low-educated; Crowding Out; Fixed effects

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1. Introduction

Increasing unemployment rates have become a severe economic and social problem across affluent countries over the last three decades. Labor markets have gone through several restructurings and became more flexible, including a sharp increase in the proportion of nonstandard employment arrangements (Kalleberg, 2009; Esping-Andersen & Regini, 2000). Globalization and international competition has wrought structural uncertainty and market risks particularly among labor market entrants (Mills & Blossfeld, 2005). Aside from these more destandardized and insecure work arrangements, (long-term) unemployment, however, remains the 'ultimate form of work precarity' (Kalleberg, 2009, p. 6).

Among other life course consequences, unemployment has persistent negative effects on individuals' subsequent working career in terms of earnings losses and career complexity over the life course (e.g. Gangl, 2006; Manzoni & Mooi-Reci, 2011). Educational achievement mitigates the exclusion from the labor market: the highly educated are considerably less exposed to unemployment than the low-educated (Brauns, et al., 2003; Gesthuizen, et al., 2011). This seems to be particularly true for Germany, where low-educated workers have the highest unemployment rate among OECD countries (OECD, 2009).

In times of increasing structural and economic uncertainty, employers try to shift the increasing labor market risks further to those individuals who have always been disadvantaged (Breen, 1997). While skill-biased technological change (SBTC) leads to rising wage inequality in the US, economists argue that it increases unemployment among the low-educated in Europe thanks to rigid wage setting institutions (Blau & Kahn, 2002). By contrast, the sociological literature assumes that low-skilled workers in European labor markets increasingly suffer from being allocated to temporary employment rather than unemployment (DiPrete, et al., 2006). In fact, most of the countries in Europe show increasing relative temporary employment rates among low-educated workers, but quite

stable or even decreasing trends in the educational divide of unemployment risks (Gebel & Giesecke, 2011). Again, Germany seems to be an exceptional case: Low-educated individuals experienced a sharp increase in relative unemployment risks compared to medium and high educated workers over time (Gebel & Giesecke, 2011; Noelke, 2008). Since the German labor market is characterized by a qualificational space (Maurice, et al., 1986), where educational qualifications are strongly linked with occupational positions, low-educated without any academic or vocational training may be particularly disadvantaged and become more so in this labor market setting.

Against this background, the aim of the paper is twofold. First, it aims to describe long-term changes in the relationship between educational attainment and unemployment risks upon labor market entry in West Germany from the mid-1970s to the present. Prior studies are sparse, restricted to a shorter time frame (e.g. Brauns, et al., 2003; Gangl, 2003) or consider only broad educational groups (Gebel & Giesecke, 2011). This paper extends previous research by investigating how, for instance, school-leavers from vocational and general tracks compare in terms of unemployment risks over time and whether unemployment risks differ among graduates from different higher education institutions. In order to address these trends, I made use of unique large-scale repeated cross-sectional data, the German Microcensus.

In a second step, the paper aims to identify the mechanisms for increasing relative unemployment risks among the low-educated in West Germany. Economic and sociological theories offer two different scenarios: *structural crowding-out* due to an oversupply of tertiary graduates or *cyclical crowding-out* caused by a general shortage of jobs during worsening macroeconomic conditions. Based on a European comparison, Gangl (2003) showed that the unemployment rate among the low-educated is particularly responsive to the current economic climate. Some Dutch studies also find support for cyclical crowding-out

(Teulings & Koopmanschap, 1989; Van Ours & Ridder, 1995), while others do not find any evidence (Gautier, et al., 2002). For West Germany, Pollmann-Schult (2005) provides evidence for cyclical crowding-out at the worker inflow. However, only one study tests the effects of structural and cyclical crowding-out simultaneously. In contrast to previous studies, it provides evidence for structural crowding-out in the Dutch labor market (Gesthuizen & Wolbers, 2010). This paper adds to the literature by assessing whether structural and/or cyclical crowding-out is responsible for the increasing relative unemployment rate among the low-educated in Germany.

In the following section I introduce the theoretical considerations and hypotheses with a particular emphasis on the German context. The next sections present the analytic strategy and the empirical results. Before concluding the paper I reassess the robustness of these results with a fixed-effects approach on the German state level.

2. Theoretical considerations

2.1 Educational attainment and unemployment risk

In order to explain qualification-specific unemployment risks, job competition or matching theories (Thurow, 1975, 1979; Sørensen & Kalleberg, 1981) provide a useful framework. In contrast to human capital theory, these models assume that some individuals become unemployed when the supply of workers exceeds the number of vacant jobs. While job seekers are ranked into a labor queue according to their amount of training costs, employers match these workers to vacant jobs in a second queue that are sorted according to their skill demands. Since employers do not know job seekers' true productivity, they primarily use educational qualifications as indicators of future performance. Individuals' educational attainment thus determines their relative position in the labor queue. In times of slack demand, the low-educated at the bottom of this labor queue will be pushed out of the labor

market. Hence, we can assume that the higher one's educational achievement, the less likely individuals become unemployed.

Since employers aim to keep the training costs as low as possible, they look for school-leavers that already have some expertise or skills that match the future job tasks. The German dual apprenticeship system prepares students for specific occupations both in school-based and on-the-job training. Consequently, school-leavers with vocational qualifications have occupation-specific skills and are, further, familiar with the organizational culture of a specific company. Moreover, employers use vocational training as a screening device in order to evaluate workers prior to making final hiring decisions (Dustmann & Schöneberg, 2008). The dual system is highly standardized and thus vocational qualifications are reliable credentials that can be used by employers from all companies (Winkelmann, 1996). Since the availability of training places depends on employers' demand, apprentices have good chances of being offered a permanent position afterwards.

The lower-tier polytechnics (Fachhochschulen) also teach more practical and occupation-specific fields of study and skills. Thus, their graduates may, likewise, signal lower training costs to employers than their counterparts from university. While Fachhochschule graduates lag behind university graduates in accessing the most advantageous occupational positions (Müller, et al., 2002; Klein, 2011), Fachhochschule degrees may protect their graduates more effectively from joblessness than university degrees thanks to their occupational specificity.

Overall, vocational training serves as a "safety net" in terms of avoiding unemployment and gaining access to skilled positions (Arum & Shavit, 1995). This is particularly true in qualificational spaces such as Germany, where vocational education is specific rather than general (Shavit & Müller, 2000; Brauns, et al., 2003). In line with these theoretical considerations and previous findings, *hypothesis 1* suggests that vocationally

qualified job seekers have lower unemployment risks than school-leavers with general education. The low-educated at the bottom of the labor queue face the highest unemployment risk among all groups.

2.2 Low-educated and disadvantages in employment relations

In order to explain why the low-educated experience an increasing relative risk of unemployment over time, I draw on labor market segmentation theories (Doeringer & Piore, 1971; Sørensen, 1983; Sørensen & Kalleberg, 1981).[1] Low-educated individuals are commonly found and systematically restricted to open positions in secondary labor markets that are accessible for every job seeker at all times. Open positions provide a labor contract that is short-term, entail a specific exchange of money for effort and are thus characterized by high turnover and job insecurity. By contrast, closed positions in the primary labor market are linked to internal career ladders offering relatively high wages and wage progression, good labor conditions and a high employment protection. These positions protect incumbents against external competition and thus restrict access for other potentially more productive job seekers. Hence, it is extremely difficult to gain access to closed positions when being employed in the secondary labor market (Blossfeld & Mayer, 1988).

Employers establish closed positions especially for professional or managerial jobs since they want to avoid a loss of job- or firm-specific expertise or knowledge and thus sustain long-term relationships with their employees. For these jobs, labor turnover would involve high transaction costs because training costs are substantially higher than for unqualified jobs (Doeringer & Piore, 1971). High-skilled occupational positions are also

[1] Increasing unemployment exposure among the low-educated is frequently associated with a decline in low-skilled employment in the course of skill-biased technological change (e.g. Nickell & Bell, 1995). Recent literature shows that the transformation from an industrial to a service economy includes a substantial growth in low-skilled service jobs (Autor, et al., 2008; Goos & Manning, 2007; Wright & Dwyer, 2003). For Germany, we see modest tendencies towards polarization, but clearly no decline in low-skilled jobs (Dustmann, et al., 2009; Spitz-Oener, 2006). Therefore, it is unlikely that SBTC is able to explain decreasing employment chances for the low-educated in Germany.

strongly intertwined in the firm-specific division of work and thus require a stronger stability of the personnel (Sørensen & Kalleberg, 1981). Due to difficulties of monitoring professional or managerial work tasks, employers assign a service contract to highly qualified employees in order to gain their commitment and maximize their efforts (Goldthorpe, 2007b). Likewise, Sørensen (1983, p. 211) argues that promotion systems act as motivational devices in case of supervision difficulties. Overall, employers have a keen interest to minimize the risk of recruiting an unproductive job seeker into closed positions.

Since this problem of asymmetric information is never solved, employers have reasonable incentives to maintain a service relationship with highly skilled employees in times of increasing economic and structural uncertainty. Rather, they transfer growing market risks to unskilled workers, who are already faced with high levels of job insecurity (Breen, 1997). Given this argumentation, *hypothesis 2* assumes that the unemployment gap between the low and high educated has become larger over time. The literature discusses two different processes that may account for this development: structural and/or cyclical crowding-out.

2.3 Structural crowding-out

The sociological literature emphasizes the potentially negative consequences of educational expansion in terms of structural crowding-out (Thurow, 1979; Åberg, 2003; Gesthuizen & Wolbers, 2010; Solga, 2002; Wolbers, et al., 2001). This scenario relies on the assumption that the occupational upgrading, i.e. an increase in high-skilled positions over time, lags behind the expansion of higher education graduates. Due to an oversupply of job seekers with a degree, the high-skilled labor market is increasingly unable to allocate all graduates into appropriate occupational positions. Consequently, increasing numbers of graduates are overeducated and displace individuals with intermediate educational qualifications in their common jobs. In a chain reaction from above, the low-educated at the bottom of the labor queue are pushed out of the labor market.

In relation to Germany, higher education expansion was rather low by international comparison (OECD, 2013) and, further, occupational upgrading was found to keep rather pace with the modest increase in graduates (Klein, 2011; Müller, et al., 2002). Thus, structural imbalances, on the one hand, may have been too weak to stimulate significant displacement processes from above. On the other hand, in qualificational spaces such as Germany, the low-educated may be particularly exposed to structural crowding-out. This is because graduates have difficulties to displace vocationally qualified school-leavers from their occupational positions due to their occupation-specific skills (Blossfeld & Mayer, 1988; Noelke, 2008). Overall, *hypothesis 3a* proposes that *structural crowding-out* contributes to the increasing relative unemployment risks among low-educated.

2.4 Cyclical crowding-out

Economists stress the potential of cyclical crowding-out, i.e. the low-educated become increasingly unemployed during severe macroeconomic conditions, while finding employment again when conditions improve. In this scenario, qualified workers that - due to tightening labor market conditions - do not find a job that matches their qualification lower their reservation wage and accept jobs for which they are overeducated. Although overeducated employees may immediately change to jobs that match their qualification when macroeconomic conditions improve, employers temporarily raise their hiring standards and prefer skilled over unskilled workers because they show a higher productivity (Okun, 1981). When the economic climate improves, they can easily hire any unskilled worker who is – thanks to the lower training requirements in these posts - capable of doing that job. The worse the economic conditions are, the more selective employers hire according to individual characteristics such as educational qualifications (Wolbers, et al., 2001).

Cyclical crowding-out may not only emerge at the worker inflow but also at the worker outflow. As previously argued, the low-educated are overwhelmingly found in open

positions in the secondary labor market (Blossfeld & Mayer, 1988). Due to low employment protection and cheap adjustment costs in these positions, the dismissal of low-educated workers in Germany is much easier than the dismissal of the highly educated. The low-educated in Germany have a high risk of being employed in fixed-term contracts and have been increasingly found in these jobs over time (Gebel & Giesecke, 2009). Since these jobs expire at a predetermined time point, they facilitate the outflow of the less-educated during times of economic insecurity. At each job complexity level, the less-educated may have higher risks of becoming unemployed due to their lower productivity (Pollmann-Schult, 2005). Consequently, the low-educated should have a higher risk of being laid off than higher educated individuals during economic downturns (Van Ours & Ridder, 1995; Erlinghagen, 2005).

While Gangl (2003) provided evidence for cyclical crowding-out at the European level, Pollmann-Schult (2005) indicated processes of cyclical crowding-out in Germany – at least at the worker inflow. Apart from cyclical fluctuations, aggregate unemployment rates steadily increased over time in modern economies, including Germany. Hence, an increasing trend of cyclical crowding-out may have largely contributed to the increasing unemployment gap between low-educated and all other educational groups. Therefore, *hypothesis 3b* proposes that *cyclical crowding-out* contributes to the increasing relative unemployment risk among the low-educated.

3. Data and Methods

3.1 Data

For the purposes of this paper, I made us of large-scale repeated cross-sectional data, the German Microcensus. This is a representative survey of the German population and its economic activity and covers one per cent of all German households. Due to data protection provisions I am able to analyze 23 scientific use files covering the survey years 1976, 1978,

1980, 1982, 1985, 1987, 1989, 1991, 1993 and 1995–2008, each of which is a 70 per cent random subsample of the original data. These data are advantageous since they involve a high continuity of the survey design, large sample sizes and few occurrences of unit or item non-response due to legal obligation of participation.

The analysis concentrates on West Germany in order to exploit the full range of data since the mid-1970s. Inactive individuals or students who are in full-time education at the time of the interview are excluded from the sample. I further restrict the analysis on labor market entrants since they are most vulnerable to changing macrostructural and macroeconomic conditions (Gangl 2003). The Microcensus neither provides information on the first job nor on the process of labor market integration. Therefore, labor market entry is defined by typical graduation ages and measured as a five-year time frame for all educational groups. School-leavers who do not a gain a higher education entrance qualification (Abitur) are considered in the ages 20 to 24. School-leavers with Abitur are included into the sample when they are 25 to 29. For tertiary graduates, labor market entry is determined by the ages 30 to 34. Due to a gender segregated labor market, all analyses are conducted separately for men and women. The total number of observations is 227,124 for men and 192,136 for women.

3.2 Variables

The *risk of unemployment* is measured as a binary indicator differentiating between unemployment and employment (i.e. dependent employment, self-employment or family workers). The unemployment status at the time of the interview is defined according to ILO convention (ILO, 2005).

The *highest educational attainment* is measured with the CASMIN educational classification (Brauns & Steinmann, 1999; Lechert, et al., 2006). On the one hand, this scale distinguishes three hierarchical levels of educational attainment, elementary education (1),

secondary education (2) and post-secondary education (3). On the other hand, it further differentiates between academic, general education and vocationally oriented training. CASMIN 1ab includes individuals without any completed degree (1a) or a qualification from Hauptschule (lower secondary school) (1b). School-leavers in CASMIN 1c additionally complete an apprenticeship after Hauptschule. While CASMIN 2a school-leavers have a qualification from Realschule (intermediate secondary school) plus a successfully completed apprenticeship, those in CASMIN 2b graduate from Realschule only. Likewise, CASMIN 2c_voc school-leavers gain the Abitur at Gymnasium (upper secondary school) and complete and apprenticeship, whereas the CASMIN 2c_gen group acquires the Abitur only. With regard to higher education, the scheme differentiates between university (CASMIN 3b) and Fachhochschule (CASMIN 3a) graduates. This classification was developed for comparative social stratification and social mobility research and has been widely used in research on social mobility (e.g. Breen, 2004) and school-to-work transitions (e.g. Brauns, et al., 2003; Shavit & Müller, 1998). Particularly in countries with a strong vocational system and a high degree of credentialism such as Germany, the CASMIN scale has been proven to be a valid measurement of educational attainment in terms of different outcomes (Braun & Müller, 1997). All analyses control for individuals' *citizenship* in order to disentangle the estimated effects of educational attainment and ethnic origin on unemployment risks.

In order to test the assumptions of cyclical and structural crowding-out, I introduce two macro-level measures that are generated from the micro-data. Structural changes are operationalized by yearly changes in the ratio of the proportion of tertiary graduates (CASMIN 3ab) and the proportion of individuals employed in high-skilled positions (see Gesthuizen & Wolbers, 2010; Gesthuizen, et al., 2011 for similar approaches). High-skilled positions are operationalized with the service class (EGP I and II) indicating appropriate

occupational positions for higher education graduates (Erikson & Goldthorpe, 1992).[2] A service relationship involves not only a salary and various perquisites but also prospective benefits such as promotion opportunities or employment security. This *labor supply-demand ratio (LSDR)* should reflect the (im-)balance between educational expansion and occupational upgrading and thus the potential for structural crowding-out among labor market entrants.

The existing literature commonly operationalizes the *business cycle (BC)* with fluctuations in the aggregate unemployment rate (e.g. Blanchflower & Freeman, 2000; Breen, 2005; Gangl, 2003; Gautier, et al., 2002; Gesthuizen & Wolbers, 2010; Noelke, 2008; Pollmann-Schult, 2005). To be consistent with and contribute to this literature, I follow their approach and measure the business cycle as yearly changes in the aggregate unemployment rate in the total labor force, age 15 to 64.[3]

3.3 Analytic strategy

In a first step, I assess changes in education-specific unemployment risks in West Germany over time. Since the comparison of log-odds ratios or odds-ratios across samples is confounded by variation in unobserved heterogeneity and may thus bias substantive changes over time (Mood, 2010), I show year-specific *average marginal effects (AMEs)* on the probability of being unemployed. In a second step, I test whether *structural* or *cyclical crowding-out* or both of them account for changes in the educational stratification of unemployment. Based on the pooled time-series data, I specify a logistic regression model for both sexes that measures the effects of CASMIN groups, labor supply-demand ratio (LSDR), business cycle (BC) and interaction terms between educational groups and both macro-level factors on the risk of unemployment. The interaction terms indicate whether educational

[2] In order to derive the measure of social class, information on occupation (KldB, Klassifizierung der Berufe) and employment status was used.

[3] While there are other indicators of the business cycle (e.g. GDP growth) available, I believe that the aggregate unemployment rate is the appropriate measure in this particular context. Since the theoretical framework on cyclical crowding-out relies on a demand cut for (youth) labor and increasing vacancy competition among labor market entrants, the aggregate unemployment rate is the most direct measure of slackening and tightening labor market conditions.

groups are differently affected by structural or cyclical changes in their unemployment risk. In non-linear models, the magnitude of the interaction effect may not equal its marginal effect and could even be of opposite sign (Ai & Norton, 2003). Therefore, I calculate for every CASMIN group the respective *marginal effects* of the continuous measures structural change and cyclical change on the probability of being unemployed, holding the other macro-level factor at the mean.

4. Results

4.1 Educational attainment and unemployment risks over time

Figure 1 shows qualification-specific average marginal effects on the probability of being unemployed compared to university graduates between 1976 and 2008. In order to ease the interpretation with regard to the first hypothesis, vocational tracks are shaded black and general tracks are shaded grey. For both sexes, the educational divide in unemployment risks between school-leavers without vocational training and school-leavers with either vocational training or a degree is evident. Vocationally qualified job seekers are less affected by unemployment than their peers with general education at all educational levels.[4] Even graduates from the more practically oriented Fachhochschule have similar or better employment chances in comparison to university graduates. In West Germany, the vocational vs. general divide tends to be more relevant than the educational level in terms of unemployment risk. This is evidenced by the fact that school-leavers from CASMIN 2c_voc and CASMIN 2a do not substantially differ from graduates with regard to employment chances. The results provide strong support for *hypothesis 1*.

[Figure 1]

[4] Since CASMIN 2c_gen school-leavers are a small group, their unemployment risk seems to be particularly volatile and should not be over-interpreted.

The most salient development is the sharp increase in the relative unemployment risk among the low-educated without any vocational training (CASMIN groups 1ab and 2b). For these groups, the increase is strongest at the beginning of the 2000s. Although the unemployment gap shrinks again at the end of the observation period, having a degree or having participated in an apprenticeship clearly became more crucial for finding employment upon labor market entry over time. At the 2000s peak, men and women from CASMIN 1ab had a probability of being unemployed that was, on average, almost 40 percentage points higher than the probability for university graduates. Since the beginning of the 1990s, even CASMIN 1c school-leavers (Hauptschule + vocational training) experienced increasing relative unemployment risks. Possibly, a growing supply of vocationally qualified school-leavers with higher general education induced increasing skill requirements in the labor market. Overall, the results provide strong evidence for *hypothesis 2.* Further, Figure 1 illustrates that educational qualifications structure the risk of unemployment in similar ways for both sexes at all points in time.

4.2 Changes in structural and macroeconomic conditions in West Germany

Figure 2 depicts growth rates for our two macro-level indicators business cycle (BC) and labor supply-demand ratio (LSDR) as well as the unemployment rate among CASMIN 1ab school-leavers in comparison to 1976. For men, the ratio between higher education graduates and service class positions tended to show only few changes over time. While job competition among male graduates somewhat increased across the 1980s, it became less tight again at the end of the observation period. For women, this ratio has somewhat more increased than for men, i.e. higher education expansion grew a lot faster than the upgrading of occupational positions. Likewise, this structural imbalance among women was mainly restricted to the 1980s. Apart from exceptional periods, occupational upgrading seems to have rather kept pace with the modest expansion of highly educated labor market entrants in

West Germany (see Appendix Table 1). If at all, structural crowding-out seems to be a more likely scenario among women than men in West Germany.

[Figure 2]

Changes in the unemployment rate among CASMIN 1ab school-leavers clearly parallel cyclical changes: sharply increasing in economic downturns and decreasing in economic upturns. The only salient deviation between these two curves can be found for women in the mid-1990s. Irrespective of any cyclical fluctuations, the aggregate unemployment rate increased over time. Hence, vacancy competition due to a cut of labor demand became in general more severe. Therefore, it is plausible to assume that cyclical crowding-out strongly contributes to the disproportionate increase in unemployment risk among the low-educated. In the following, I will investigate with more profound statistical analyses whether *structural* or *cyclical crowding-out* or both account for the increasing relative disadvantages in unemployment risks among the low-educated.

4.3 Structural or cyclical crowding-out?

Appendix Table 2 (men) and Table 3 (women) show the effects of educational attainment, labor supply-demand ratio (LSDR), business cycle (BC) and interaction terms between educational attainment and both macro-level measures on the risk of unemployment in terms of logit coefficients (full model 4). Since Fachhochschule and university graduates do not substantially differ in their unemployment risk, they were merged in these analyses. Due to a small number of cases, CASMIN 2c_gen were combined with CASMIN 2c_voc as well. Structural and cyclical changes are measured as growth rates in comparison to 1976 (set to 1). In order to properly interpret the interaction effects, I calculated the marginal effects of these continuous macro-level measures for every qualification separately (for predicted

probabilities see Appendix Figures 1 and 2). Figure 3 illustrates the education-specific *marginal effect* of structural changes, i.e. changes in the ratio of the proportion of graduates and service class positions, on the probability of being unemployed. Higher values on the X-axis (LSDR) indicate a labor supply that outpaces the demand, i.e. an oversupply of tertiary graduates. The grey lines surrounding the slope of the marginal effect indicate the 95% confidence intervals.

Among men, the marginal effect of structural changes is negative for all educational groups except for tertiary graduates. Against expectations, the risk of unemployment for school-leavers below tertiary level decreases when structural conditions in the high-skilled labor market worsen. By contrast, the marginal effect of structural changes is significantly positive for graduates, i.e. their unemployment risk increases in times of an oversupply of graduates. Hence, it is male graduates that suffer most in regards to unemployment when labor supply outpaces the demand at the top of the labor queue. Apparently, male graduates are unable or unwilling to displace the lower educated from their occupational positions when job competition becomes more severe. Therefore, *hypothesis 3a* has to be rejected for men.

[Figure 3]

Among women, school-leavers with a degree (CASMIN 3ab) and lower secondary school-leavers with apprenticeships (CASMIN 1c and 2a) are hardly affected by worsening structural conditions. Female Abitur holders even have a lower risk of unemployment when higher education expansion grows faster than occupational upgrading. For the low-educated (CASMIN 1ab and 2b), the probability of being unemployed increases (exponentially), the stronger the imbalance between labor supply and demand in the high-skilled labor market is. While vocationally qualified school-leavers seem to be protected by increasing joblessness in times of an oversupply of graduates, it is the lower educated without an apprenticeship that

are pushed out of the labor market when structural conditions worsen. Thus, *structural crowding-out* seems to be apparent among women and provides support for *hypothesis 3a*.

Figure 4 shows for every CASMIN group the *marginal effect* of cyclical changes, i.e. changes in the aggregate unemployment rate, on the probability of being unemployed. Higher values on this measure of the business cycle (BC) indicate worsening macro-economic conditions and thus a tighter vacancy competition in the labor market. Among men, tertiary graduates and Abitur holders are only weakly affected by cyclical changes in their unemployment risk, even under the most severe macroeconomic conditions. As expected, school-leavers from CASMIN 1ab are most susceptible to unemployment when the economic climate worsens. Compared to all other groups, this marginal effect is strongest at the start of macroeconomic deteriorations. While substantially increasing when macroeconomic conditions become more severe, the curve of this marginal effect increases at a slower rate than at the start of economic downturns. By contrast, the marginal effects for school-leavers from CASMIN 1c, 2a and 2b exponentially rise when economic downturns are most pronounced. Hence, school-leavers who completed an apprenticeship are particularly hit by unemployment under most severe economic conditions.

For women, the impact of the business cycle on vocationally qualified school-leavers and tertiary graduates is rather moderate. However, female graduates and Abitur-holders are more affected by cyclical changes in their unemployment risk than their male counterparts. As with men, the low-educated without vocational training (CASMIN 1ab and 2b) are most vulnerable to cyclical changes in terms of increasing unemployment probabilities. As with men, low-educated women seem to suffer most from increasing unemployment when the economic climate starts to worsen. In severe economic downturns, however, the slope of the marginal effect for CASMIN 1ab school-leavers becomes less pronounced. By contrast, for

CASMIN 2b school-leavers the slope is much steeper and rises exponentially. For both sexes, the results are line with *hypothesis 3b*.

[Figure 4]

4.4 How much do macro-level effects explain?

For different macro-level conditions, Figure 5 indicates education-specific discrete change effects in terms of the likelihood of unemployment compared to graduates (CASMIN 3ab). The left-hand graph illustrates the magnitude of the unemployment gaps when macro-level conditions are set to the mean, i.e. average macroeconomic and structural conditions. The right-hand graph indicates a combination of macro-level conditions that has been found to be 'best' for low-educated in terms of avoiding unemployment in the previous analysis. For both sexes, I assume the lowest aggregate unemployment rate in the observation period. 'Best' structural conditions are assumed to be different for female and male low-educated. While modeling the worst balance between graduates and service class positions in the observation period for men, the least tightened job competition in the high-skilled labor market is assumed for women.

Under average macro-level circumstances, low-educated men from CASMIN 1ab have a probability of being unemployed that is almost twenty percentage points higher than for male graduates. Further, we see a large difference between CASMIN 2b school-leavers and tertiary graduates when macro-level conditions are set on average. Differences between school-leavers with vocational and tertiary degrees appear to be rather modest, albeit significant at the 5%-level. Under the 'best' circumstances the probability differences between the low-educated (CASMIN 1ab and 2b) and tertiary graduates are substantially reduced. For CASMIN 2b school-leavers, the probability would even be significantly lower

than for graduates. However, the least educated men (CASMIN 1ab), would still have a probability of unemployment that is five percentage points higher than for graduates. Nevertheless, a considerable part of the unemployment gap among men is accounted for by cyclical and structural conditions.

[Figure 5]

For women, educational differentials look similar to men's under average macro-level circumstances. Though, female Abitur holders and CASMIN 2a school-leavers have a slightly lower unemployment risk than female graduates. As for men, unemployment differentials between school-leavers without vocational training (CASMIN 1ab and 2b) and graduates are considerably reduced under the 'best' conditions. Only for the least educated, the unemployment gap - although very small - remains significant at the 5%-level. Overall, changes in structural and, particularly, cyclical conditions seem to largely account for variations in unemployment gaps between educational groups over time.

4.5 Sensitivity analysis: fixed-effects approach

In order to check the robustness of these results, I estimate fixed-effects models on pooled time-series cross-sectional data (Allison, 2009). For this purpose, I use time-series measures for each of the ten West German federal states (Länder) which are derived from the Microcensus. By introducing state fixed effects I eliminate all unmeasured, time-invariant differences across states that impact the educational gap in unemployment rates and may be

correlated with the macro-level factor.[5] Year fixed effects account for time-varying unobserved factors affecting all states in the same way.[6]

State-specific yearly percentage point differences in unemployment rates between the low-educated (CASMIN 1ab and 2b) and both medium educated (CASMIN 1c, 2a and 2c) and highly educated (CASMIN 3ab) are the dependent variables. As for the main analysis, structural and cyclical changes on the state level are measured with the aggregate unemployment rate and the ratio between graduates and service class positions (*basic* model). The equation is as follows:

$$\mathrm{Y_{it}} = \alpha + \beta \mathrm{BC_{it}} + \beta \mathrm{LSDR_{it}} + \sum_{1}^{i-1} \mathrm{State_i} + \sum_{t}^{t-1} \mathrm{Year_t} + \varepsilon_{it}$$

where Y_{it} is the difference in the unemployment rate between the lowest educational group and the medium or highest educational group in state i and year t; α is the constant; β is the regression coefficient; BC_{it} is a measure of the business cycle in state i and year t and LSDR_{it} a measure of the labor supply-demand ratio in state i and year t; $\mathrm{State_i}$ refers to state fixed effects; $\mathrm{Year_t}$ refers to year fixed effects; and ε_{it} is the error term. To address the problem of serial correlation in time-series data I calculate cluster-robust standard errors (Bertrand, et al., 2004).

[Table 1]

In addition to the *basic* model, I do some further robustness checks. Following Blanchflower & Freeman (2000), I measure cyclical change as the aggregate unemployment rate among prime-age workers, aged 35-54 only (*RC1*). Since crowding-out among low-

[5] The South German states, particularly Baden-Württemberg and Bavaria, have, in general, a lower aggregate unemployment rate than Northern German states. The city states of Hamburg and Bremen have the highest aggregate unemployment rates among all states.

[6] For Hamburg, the analysis only includes 22 observations, as reliable measures for the 1976 Microcensus are lacking.

educated is possibly underestimated when considering unemployment, a second robustness check (*RC2*) uses the educational gap in non-employment rates (inactivity and unemployment) as dependent variable. In order to test a measure of the business cycle that is not generated from the micro-data, I further use state-specific unemployment-to-job vacancy ratios that are taken from the labor statistics of the German Federal Employment Agency (*RC3*). The last model cannot be separately estimated by gender since statistics for gender-specific job openings cannot be provided. Table 1 shows coefficients of the business cycle (BC) and labor supply-demand ratio (LSDR) from pooled OLS regressions and fixed-effects models on the educational gap in unemployment rates for the *basic* model and robustness checks *RC1-RC3*.

With regard to structural effects, the sensitivity analysis confirms the results for men: Holding macroeconomic conditions constant, differences in unemployment rates between low and high educated decrease in times of an oversupply of tertiary graduates. In the FE model, this effect remains significant at the 5%-level. For women, the pooled OLS regressions indicate a positive effect of the labor supply-demand ratio on the divide in unemployment rates between low and high and low and medium educated, i.e. evidence for structural crowding-out. However, taking state and year fixed effects into account the FE models yield effects that are either negative or close to zero. This is already the case when controlling for year fixed effects only. Apparently, the fixed-effects model accounts for correlated trends in structural conditions and educational gaps in unemployment rates driven by unmeasured factors. Hence, the sensitivity analysis cannot confirm the previous result of *structural crowding-out* among women.

For men and women, both OLS and FE models indicate a positive impact of cyclical changes on the educational divide in unemployment rates irrespective of the measurement of the business cycle (*basic, RC1, RC3*). Worsening macroeconomic conditions also increase

differences in non-employment rates between low and high and low and medium educated (*RC2*). Except for RC1, the effect of the business cycle remains even significant at the 5%-level when applying fixed-effects models.[7] Overall, this sensitivity analysis confirms our main results and provides strong evidence for cyclical crowding-out among low-educated men and women on the West German labor market.[8]

5. Discussion

The first objective of the paper was to depict trends in the educational stratification of unemployment in West Germany over time. As expected, the most salient change is the widening gap between the low-educated (CASMIN 1ab and 2b) and medium and highly educated groups in unemployment risks for both sexes. Against widespread beliefs (e.g. Beck, 1997), the results stress the claim that the link between educational attainment or social class and employment chances did not dissolve over time (Breen, 1997; Goldthorpe, 2007a). In West Germany, the relationship between educational qualifications and unemployment risks has even become stronger over time.

Furthermore, vocationally qualified job seekers have relatively lower unemployment risks than school-leavers with general education. In order to avoid unemployment, completing vocational training became increasingly more important for school-leavers over time. Advantages of vocational training in employment chances upon labor market entry tend to be more or less preserved in later career stages (Kurz, et al., 2006; Müller, 2009). However, given that vocationally trained individuals attain lower occupational positions than

[7] When operationalizing cyclical changes as unemployment rate among prime-age workers (RC1), the effect does not remain significant at the 5%-level in the FE model (exception low vs. medium educated, men). However, this may indicate that the measure does not properly capture the business cycle since prime-age groups are protected from cyclical unemployment due to employment protection legislation.

[8] The results of the *basic* OLS and FE models have been recalculated with an estimated dependent variable (EDV) approach that corrects for insecurity in the dependent variable (Lewis & Linzer 2005). Since both coefficients and standard errors only marginally differ between standard and corrected models, I present the conventional OLS and FE models.

graduates (Klein 2011), it stresses that in West Germany 'diversion and safety net effects are not mutually exclusive but are the flip side of the same coin' (Shavit & Müller, 2000, p. 29).

The second objective of the paper was to test whether changes in macrostructural or macroeconomic conditions account for the increasing relative unemployment risks among the low-educated over time. This increasing unemployment gap can be mainly attributed to *cyclical crowding-out*. While graduates and Abitur holders are, if at all, marginally affected by economic downturns, the low-educated are highly vulnerable to changing macroeconomic conditions and become increasingly unemployed during economic downturns. Since macroeconomic conditions generally worsened over time, cyclical crowding-out contributes to the explanation of increasing relative unemployment risks among the low-educated. Fixed-effects models on the German state level confirm the effect of cyclical change on educational gaps in unemployment rates.

By contrast, *structural crowding-out* seems to be no appropriate mechanism for rising educational differentials in unemployment risks. In times of structural imbalances, i.e. the supply of higher education graduates increases more strongly than the demand, male graduates seem to be unable to displace lower educated people from their traditional positions. Instead, an increasing number of graduates experiences job losses themselves, when job competition surrounding high-skilled positions tightens. This was confirmed in fixed-effects models at the federal state level. For women, the fixed-effects models show that changing structural conditions have no impact on educational differentials in unemployment risks.

The lack of structural crowding-out may be due to the fact that higher education expansion was rather modest in West Germany by international comparison (OECD 2013). Further, occupational upgrading was more or less able to keep pace with the modest increase in the number of graduates (Klein 2011). In line with the argument of structural crowding-

out, Gesthuizen et al. (2011) show that the larger the supply of graduates in a country relative to the demand, the smaller the differences in occupational returns between low- and higher educated workers. Hence, the conditions that prompt *structural crowding-out* may just not be given on the West German labor market. Further, graduates, who need to look for underqualified occupational positions in times of an oversupply, may have difficulties in competing with school-leavers from the dual system of apprenticeship thanks to apprentices' occupational specificity.

Altogether, *cyclical crowding-out* rather than *structural crowding-out* appears to prevail in West Germany. Differences between the low-educated and all other educational groups that remain unexplained may further be attributed to an alternative but complementary explanation. Recent sociological literature argues that the labor market returns of low-educated workers are dependent on their composition in terms of social and cognitive characteristics (Solga, 2002). The larger the cognitive gap between low-educated and higher educated and the more unfavorable the composition of the low-educated in terms of social characteristics in a country, the lower employment chances and job quality among the low-educated (Abrassart, 2013; Gesthuizen, et al., 2011). Whether compositional differences not only account for cross-national variations in labor market returns among the low-educated, but also impact changes over time within a national setting has to be evaluated by future research.

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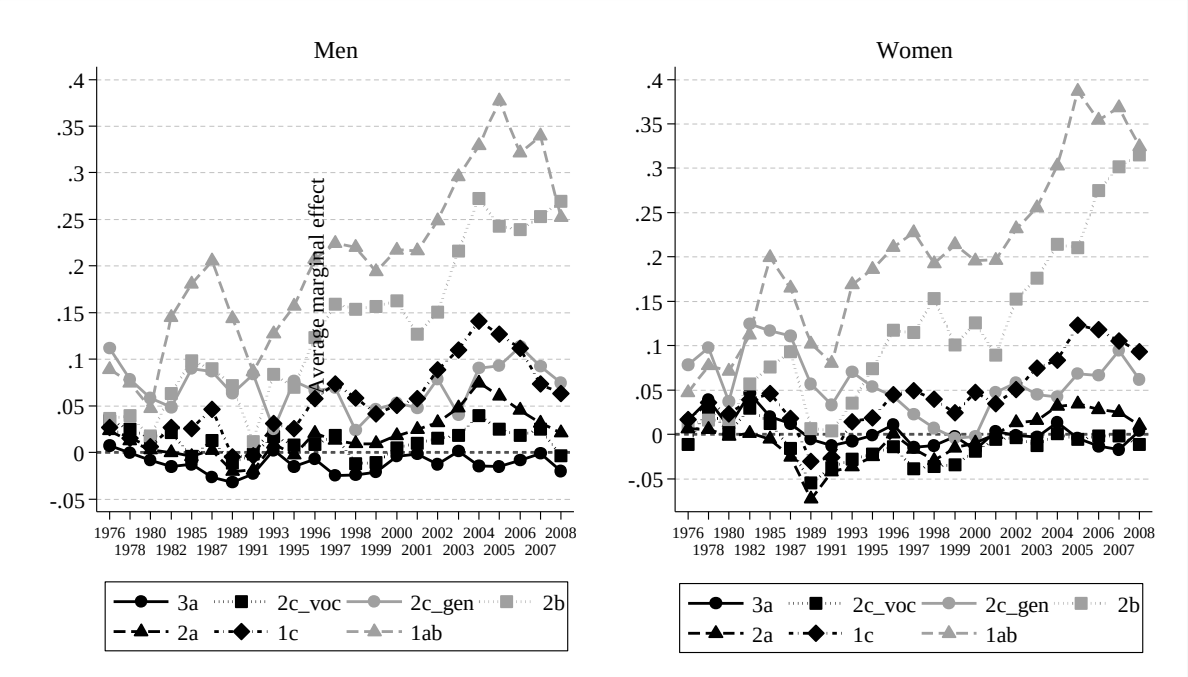
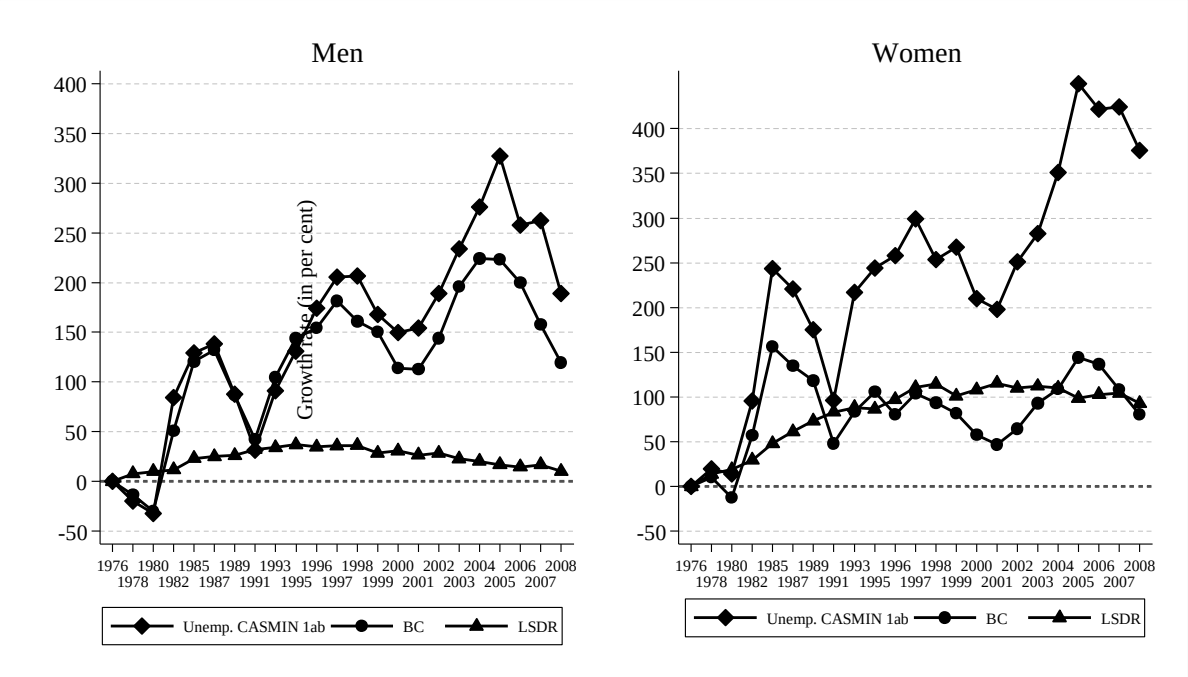
Figure 1 Trends in *AMEs* of educational attainment on the probability of being unemployed



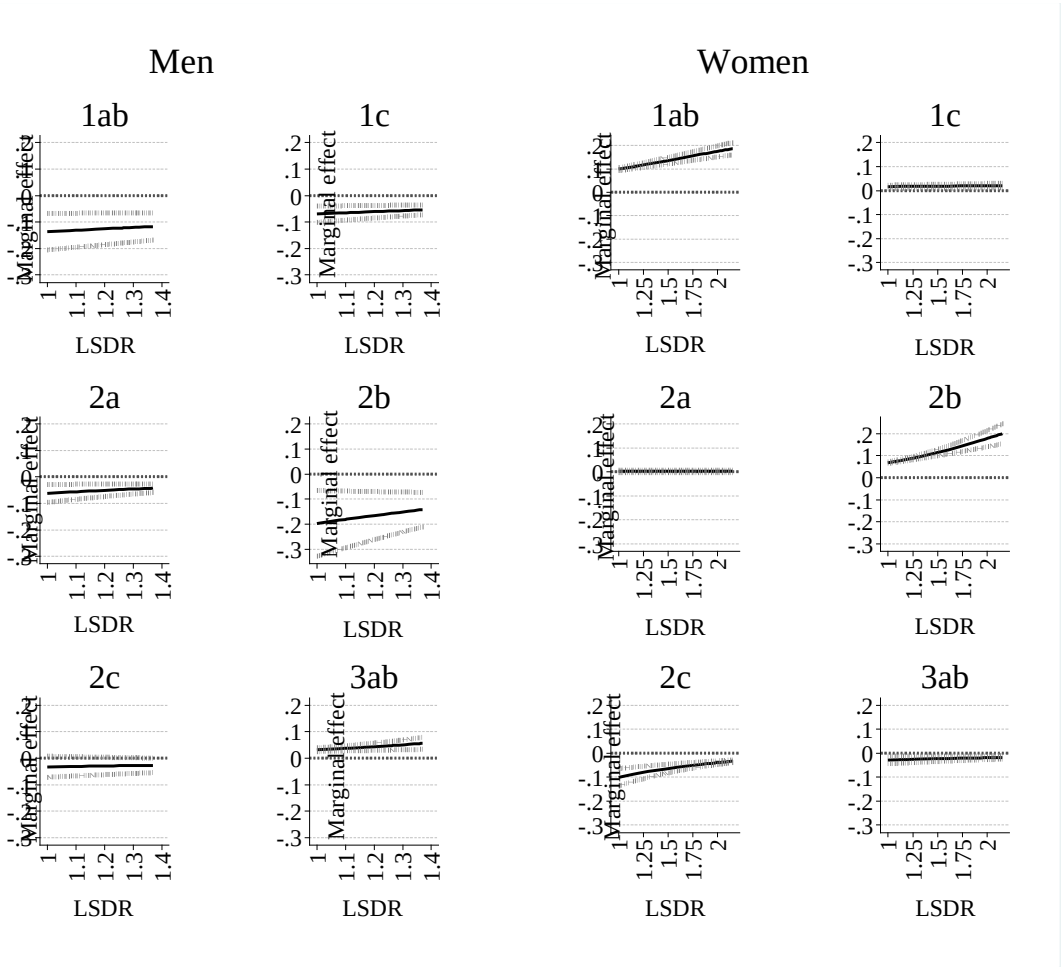
Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: Dark grey short-dashed line indicates the reference category university graduates (*CASMIN* 3b); Effect estimates shown as *average marginal effects (AMEs)*; controlling for citizenship.

Figure 2 Macro-level changes and the unemployment rate among low-educated



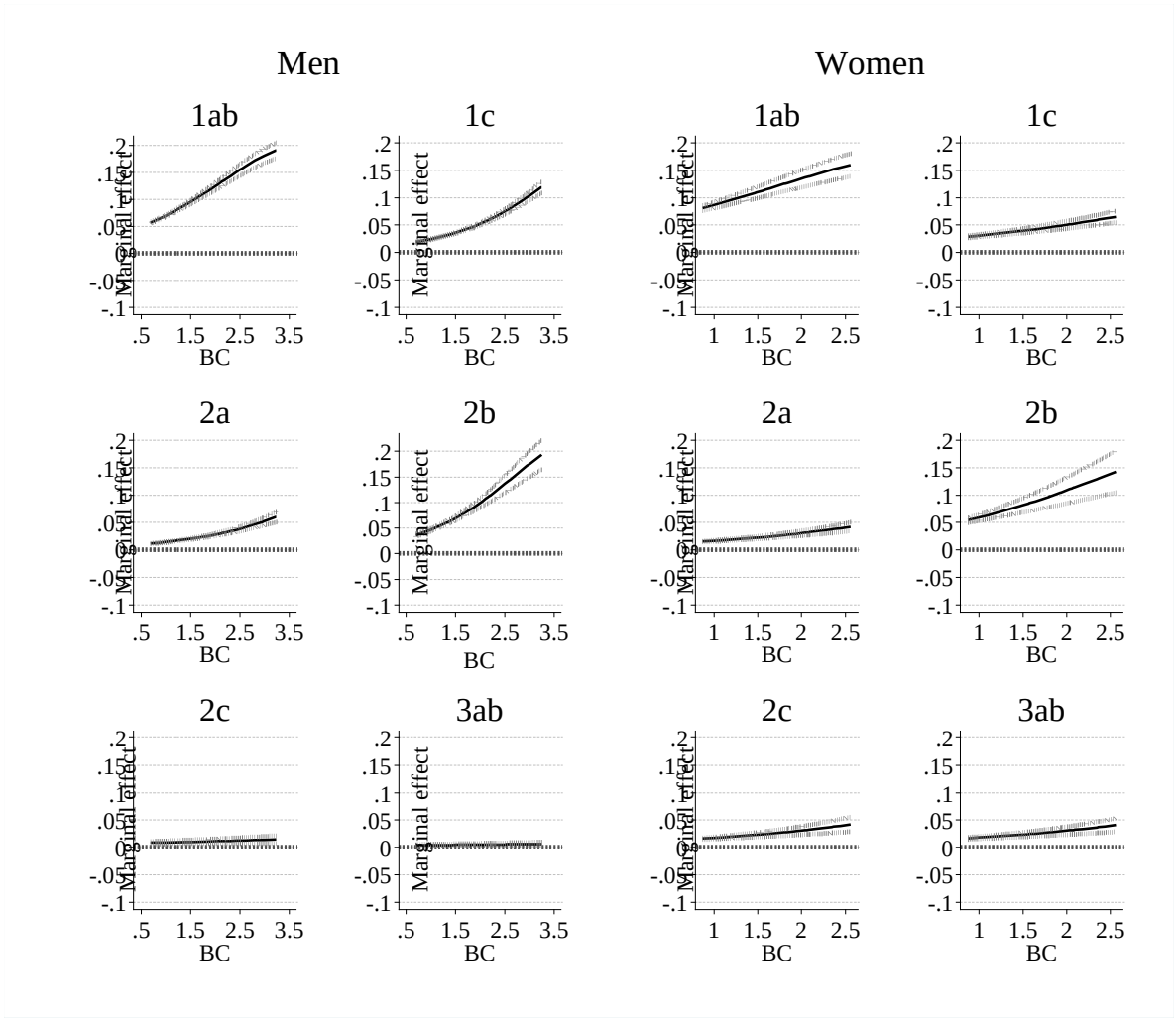
Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: BC = Business cycle; LSDR = Labor supply-demand ratio.

Figure 3 Education-specific marginal effects of structural changes



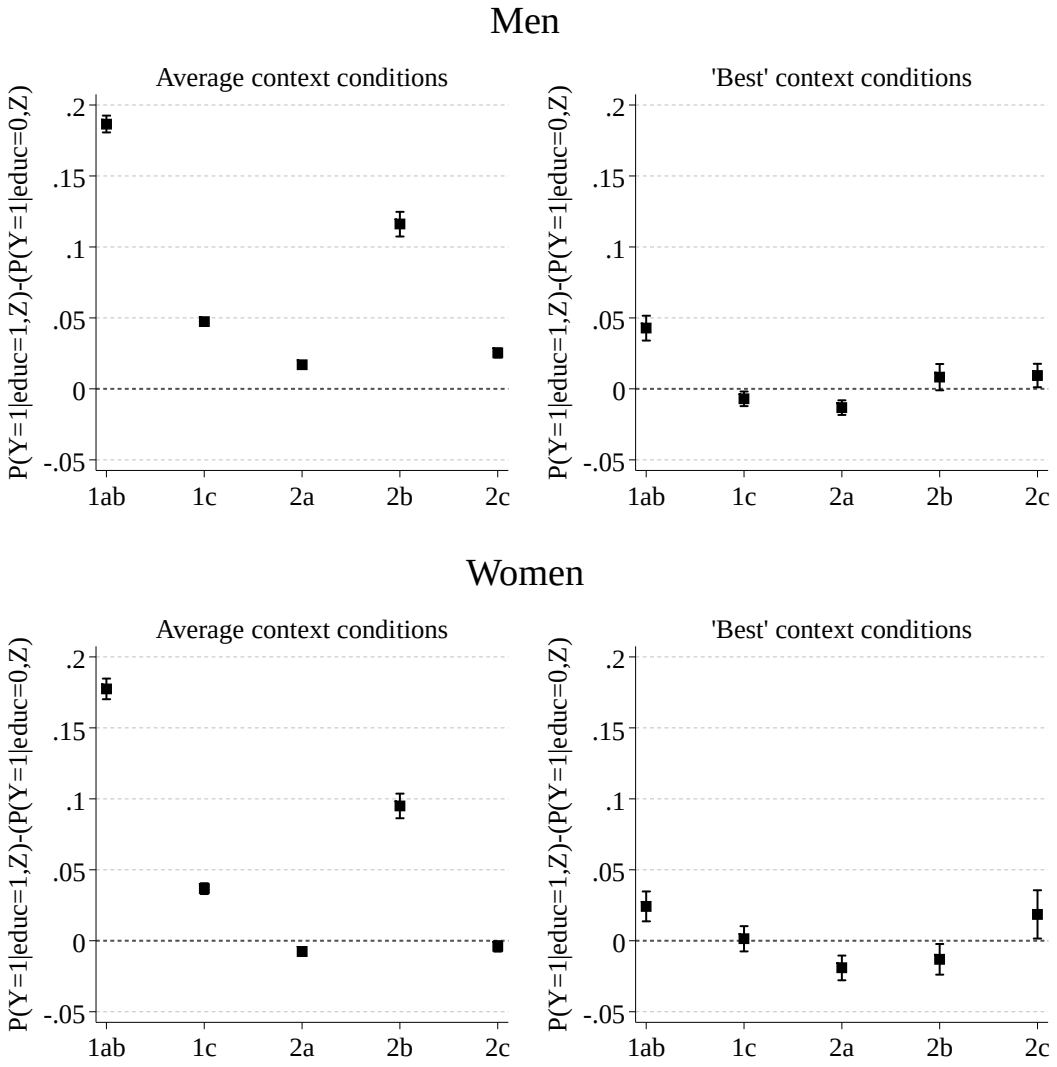
Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: Marginal effects calculated after model 4 in Appendix Tables 2 and 3; BC held constant at the mean; citizenship set to German.

Figure 4 Education-specific marginal effects of cyclical changes



Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: Marginal effects calculated after model 4 in Appendix Tables 2 and 3; LSDR held constant at the mean; citizenship set to German.

Figure 5 The unemployment gap under differing macro-level conditions



Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: Discrete change effects in reference to CASMIN 3ab (university and Fachhochschule); citizenship set to German; Ranges within capped spikes indicate 95% confidence intervals.

Table 1 OLS regression estimates of macro-level determinants on educational gaps in unemployment rates

Men		**OLS**			**FE**	
Low vs. high	BC	LSDR	R^2	BC	LSDR	R^2
Basic						
M1	2.72***(0.31)		0.53	1.96** (0.40)		0.70
M2		-0.86 (1.03)	0.01		-2.38** (0.65)	0.69
M3	2.77***(0.36)	-1.60***(0.17)	0.55	1.59*(0.61)	-1.81*(0.75)	0.71
RC1	2.70***(0.46)	-1.28***(0.22)	0.49	0.54 (0.56)	-2.14* (0.82)	0.70
RC2	2.70*** (0.24)	-2.20*** (0.18)	0.55	1.45* (0.58)	-2.52***(0.56)	0.76
Low vs. med.						
Basic						
M1	2.15*** (0.14)		0.44	1.68***(0.21)		0.59
M2		-0.18 (0.91)	0.00		-1.62* (0.68)	0.57
M3	2.17*** (0.16)	-0.76** (0.21)	0.45	1.46** (0.34)	-1.10 (0.68)	0.59
RC1	2.14*** (0.22)	-0.51* (0.18)	0.41	0.78* (0.34)	-1.27 (0.69)	0.58
RC2	2.69*** (0.27)	-0.39 (0.32)	0.50	1.38** (0.31)	-1.61** (0.48)	0.76
Women		**OLS**			**FE**	
Low vs. high	BC	LSDR	R^2	BC	LSDR	R^2
Basic						
M1	2.49*** (0.33)		0.25	2.92*** (0.42)		0.66
M2		3.21** (0.73)	0.11		-1.05 (1.18)	0.62
M3	2.23*** (0.25)	2.19** (0.60)	0.30	2.87*** (0.43)	-0.38 (1.14)	0.66
RC1	1.88*** (0.32)	1.90* (0.62)	0.23	0.78 (0.43)	-0.84 (1.17)	0.62
RC2	2.00** (0.51)	4.33*** (0.77)	0.32	2.28*** (0.63)	-1.15 (0.79)	0.80
Low vs. med.						
Basic						
M1	2.43*** (0.27)		0.30	1.80***(0.27)		0.61
M2		3.82*** (0.42)	0.19		0.08 (0.86)	0.59
M3	2.08*** (0.20)	2.86*** (0.36)	0.40	1.86*** (0.31)	0.51 (0.86)	0.61
RC1	1.90*** (0.27)	2.50*** (0.37)	0.34	0.47 (0.37)	0.21 (0.84)	0.59
RC2	1.47** (0.40)	3.72*** (0.58)	0.34	0.73 (0.48)	-0.29 (0.47)	0.69
Overall		**OLS**			**FE**	
Low vs. high						
RC3	0.57*** (0.12)	3.35** (0.95)	0.21	0.23** (0.07)	-0.76 (0.94)	0.82
Low vs. med.						
RC3	0.48*** (0.10)	3.76*** (0.69)	0.25	0.20** (0.05)	-0.03 (1.08)	0.78

Sources: German Microcensus, Scientific-Use-Files 1976-2008, Federal Employment Agency statistics, N=229; Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Cluster-robust standard errors in parentheses OLS: Ordinary least squares regression; FE: OLS with state fixed effects and year fixed effects; BC = business cycle; LSDR = labor supply-demand ratio. Standard = BC as unemployment rate among age group 15-64; RC1 = Robustness check 1: BC operationalized as unemployment rate among age group 35-54; RC2 = Robustness check 2: standard model but with the dependent variable: educational gaps in non-employment rates; RC3 = BC operationalized as unemployment-to-job vacancy ratio.

Appendix

Table 1 Distribution of educational attainment among labor market entrants (in per cent)

Men	1ab	1c	2ab	2c	3a	3b
1976-1980	13	50	19	4	5	9
1982-1987	12	42	23	7	6	10
1989-1993	10	34	26	11	8	12
1995-1999	10	25	22	14	12	17
2000-2004	12	21	24	14	13	17
2005-2008	13	21	24	15	11	16
Women	1ab	1c	2ab	2c	3a	3b
1976-1980	20	43	28	3	2	5
1982-1987	17	29	36	8	2	8
1989-1993	12	22	37	16	4	10
1995-1999	12	17	31	20	7	14
2000-2004	12	13	31	19	8	16
2005-2008	12	11	30	22	7	17

Source: German Microcensus, Scientific-Use-Files 1976-2008.

Table 2 Education-specific unemployment risks and time-varying macro-level determinants among men

Men	M1	M2	M3	M4
Intercept	-4.62 (0.11)***	-6.70 (0.37)***	-3.36 (0.15)***	-5.92 (0.35)***
Education (Ref. *CASMIN* 3ab)				
CASMIN 2c	0.61 (0.04)***	4.49 (0.42)***	0.73 (0.15)***	3.27 (0.53)***
CASMIN 2a	0.56 (0.03)***	3.21 (0.42)***	-0.49 (0.14)***	2.71 (0.47)***
CASMIN 2b	1.87 (0.04)***	4.60 (0.57)***	0.37 (0.17)*	3.75 (0.57)***
CASMIN 1c	1.11 (0.03)***	3.49 (0.48)***	-0.24 (0.11)*	2.61 (0.40)***
CASMIN 1ab	2.31 (0.03)***	2.90(0.55)***	1.06 (0.15)***	3.78 (0.41)***
LSDR	-0.43 (0.09)**	1.22 (0.29)***	-0.58 (0.09)***	1.62 (0.29)***
BC	0.71 (0.01)***	0.72 (0.01)***	0.27 (0.04)***	0.19 (0.05)***
LSDR *				
CASMIN 2c		-1.82 (0.44)***		-2.18 (0.42)***
CASMIN 2a		-2.34 (0.38)***		-2.74 (0.38)***
CASMIN 2b		-2.18 (0.46)***		-2.91 (0.47)***
CASMIN 1c		-1.67 (0.33)***		-2.46 (0.33)***
CASMIN 1ab		-1.73 (0.34)***		-2.35 (0.34)***
BC *				
CASMIN 2c			-0.04 (0.06)	0.04 (0.07)
CASMIN 2a			0.43 (0.06)***	0.53 (0.06)***
CASMIN 2b			0.62 (0.07)***	0.72 (0.07)***
CASMIN 1c			0.57 (0.05)***	0.67 (0.05)***
CASMIN 1ab			0.52 (0.05)***	0.62 (0.05)***
Citizenship (Ref. German)				
European	-0.02 (0.08)	-0.01 (0.08)	-0.02 (0.08)	-0.01 (0.08)
Turkish	0.32 (0.03)***	0.32 (0.03)***	0.31 (0.03)***	0.32 (0.03)***
Italian	-0.25 (0.07)***	-0.25 (0.07)***	-0.24 (0.07)***	-0.23 (0.07)***
Greek	0.64 (0.07)***	0.64 (0.07)***	0.65 (0.07)***	0.65 (0.07)***
Others	0.73 (0.03)***	0.73 (0.03)***	0.72 (0.03)***	0.73 (0.03)***
Pseudo R^2	0.1047	0.1050	0.1068	0.1073
N	227124	227124	227124	227124

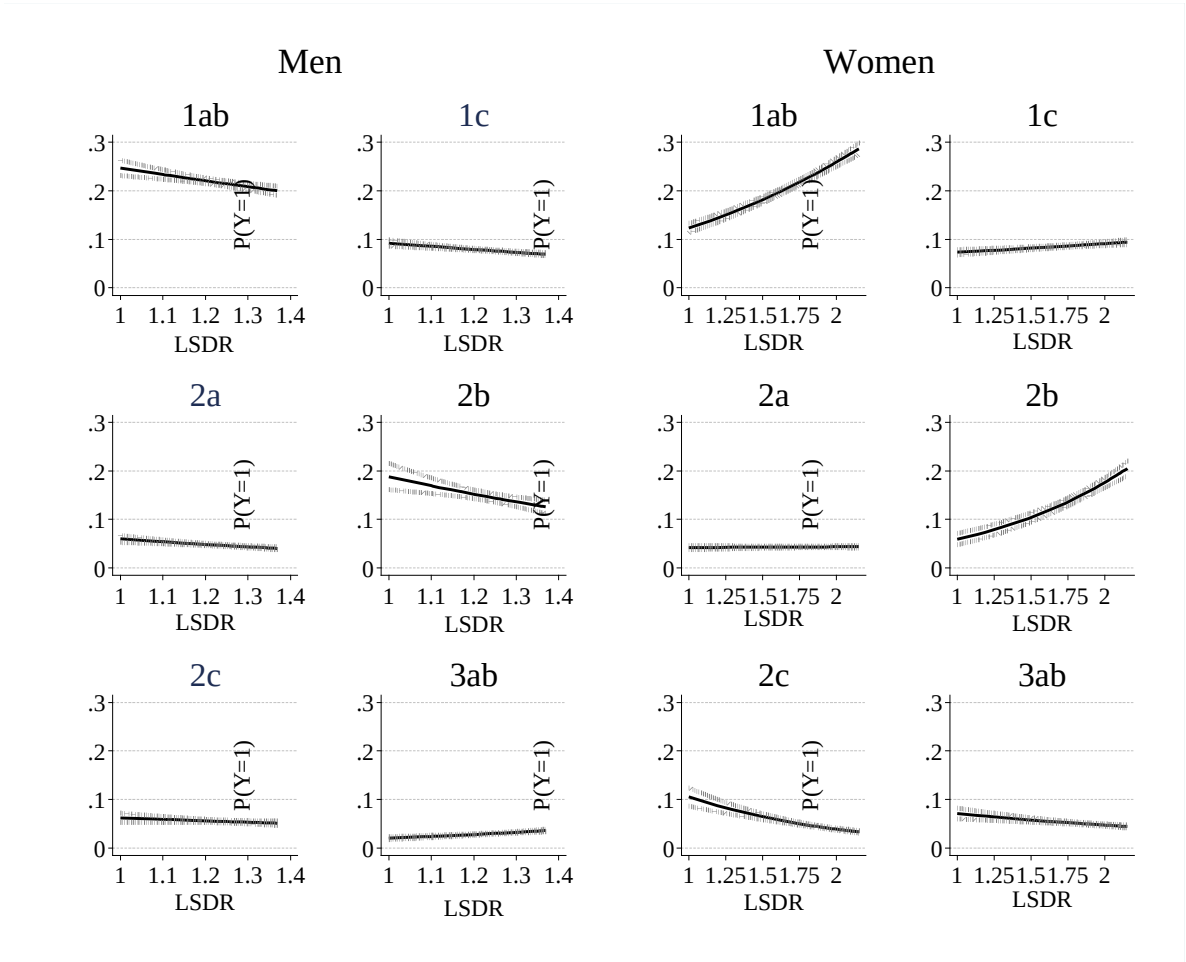
Source: German Microcensus, Scientific-Use-Files 1976-2008; Notes: Estimates shown as log-odds ratios; standard errors in parentheses; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3 Education-specific unemployment risks and time-varying macro-level determinants (women)

	M1	M2	M3	M4
Intercept	-4.91 (0.07)***	-3.33 (0.18)***	-4.57 (0.16)***	-3.22 (0.20)***
Education (Ref. *CASMIN* 3ab)				
CASMIN 2c	-0.15 (0.04)***	1.05 (0.28)***	-0.53 (0.23)*	0.98 (0.33)**
CASMIN 2a	-0.08 (0.03*	-1.06 (0.21)***	-0.29 (0.18)	-1.19 (0.25)***
CASMIN 2b	1.29 (0.04)***	-1.91 (0.28)***	0.51 (0.21)*	-2.24 (0.33)***
CASMIN 1c	0.69 (0.03)***	-0.59 (0.20)**	0.62 (0.16)***	-0.64 (0.22)**
CASMIN 1ab	1.77 (0.03)***	-0.79 (0.20)***	1.13 (0.17)***	-0.98 (0.23)***
LSDR	0.33 (0.03)***	-0.45 (0.09)***	0.32 (0.03)***	-0.44 (0.09)***
BC	0.70 (0.04)***	0.65 (0.02)***	0.53 (0.07)***	0.59 (0.07)***
LSDR*				
CASMIN 2c		-0.62 (0.14)***		-0.63 (0.14)***
CASMIN 2a		0.49 (0.11)***		0.48 (0.11)***
CASMIN 2b		1.70 (0.15)***		1.66 (0.15)***
CASMIN 1c		0.65 (0.11)***		0.68 (0.11)***
CASMIN 1ab		1.39 (0.11)***		1.35 (0.09)***
BC *				
CASMIN 2c			0.19 (0.12)	0.05 (0.10)
CASMIN 2a			0.11 (0.09)	0.08 (0.08)
CASMIN 2b			0.40 (0.11)***	0.21 (0.11)
CASMIN 1c			0.03 (0.08)	-0.00 (0.08)
CASMIN 1ab			0.33 (0.08)***	0.13 (0.08)
Citizenship (Ref. German)				
European	0.05 (0.08)	0.04 (0.08)	0.05 (0.08)	0.04 (0.08)
Turkish	0.41 (0.04)***	0.38 (0.04)***	0.41(0.04)***	0.38 (0.04)***
Italian	-0.06 (0.08)	-0.03 (0.08)	-0.05 (0.08)	-0.03 (0.08)
Greek	0.66 (0.07)***	0.66 (0.07)***	0.67 (0.07)***	0.66 (0.07)***
Others	0.62 (0.04)***	0.60 (0.04)***	0.62 (0.04)***	0.60 (0.04)***
Pseudo R^2	0.0830	0.0871	0.0835	0.0872
N	192136	192136	192136	192136

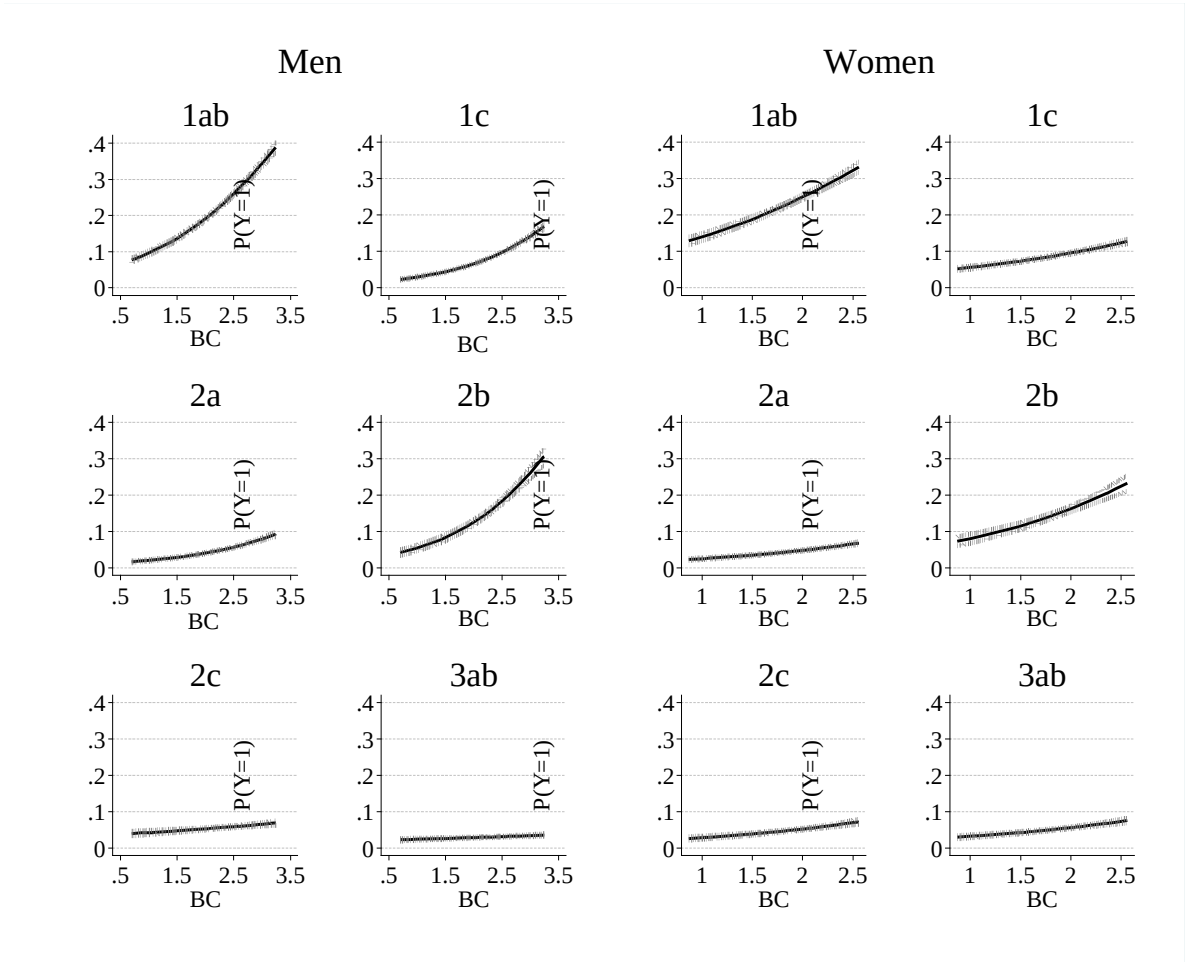
Source: German Microcensus, Scientific-Use-Files 1976-2008; Notes: Estimates shown as log-odds ratios; standard errors in parentheses; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Figure 1 Predicted probabilities of being unemployed subject to structural changes



Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: Predicted probabilities calculated after model 4 in Appendix Tables 2 and 3; BC held constant at the mean; citizenship set to German.

Figure 2 Predicted probabilities of being unemployed subject to cyclical changes



Source: German Microcensus, Scientific-Use-Files 1976-2008. Notes: Predicted probabilities calculated after model 4 in Appendix Tables 2 and 3; LSDR held constant at the mean; citizenship set to German.